

Quality of Care in Women With Stage I Cervical Cancer

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A study was done to assess the quality of care received by women with stage I cervical cancer. Through a population-based registry serving 13 counties of western Washington, including Seattle, we identified all women residents in whom local-stage cervical cancer developed between January 1974 and December 1978 (N=369). The cases were subdivided into stage IA (microinvasive) and stage IB (frankly invasive). Quality of care was defined as optimal or sub-optimal at the outset of the study; this definition applied to all cases. In patients with stage IB cervical cancer, striking relationships were found between the quality of care and initial and referral hospital characteristics and physician's specialty. No differences were found, however, in three-year survival between the optimally and suboptimally treated groups.

THE PURPOSE OF THIS STUDY was to assess the quality of care received by women with stage I cervical cancer and to explore the relationship between quality of care and hospital, physician and patient-related variables. Investigating the process of care, that is, how medical resources are used in the treatment of patients, is useful in assessing the quality of care. Although this approach does not measure final outcome, it does indicate the extent to which physicians follow medical standards.

Methods

With the assistance of the Cancer Surveillance System (CSS) a population-based tumor registry

serving 13 counties of western Washington, including Seattle, all women residents newly diagnosed with stage I cervical cancer from January 1, 1974, to December 31, 1978, were identified. In all, 156 women had stage IA (microinvasive) and 213 women stage IB (frankly invasive) disease. Abstracts of the medical records of all the women were reviewed for accuracy of substaging and were reclassified (5 percent) as necessary. Patient characteristics, tumor histology, characteristics of county of residence (urban or rural and the presence of a radiation facility), physician characteristics and initial and referral hospital characteristics were obtained.

We defined quality of care received and coded it (J.C.) as a dichotomous variable (optimal or suboptimal). Optimal care in stage IA was defined as having a cone biopsy for diagnosis followed by a simple hysterectomy for treatment.^{1,2} Optimal care in stage IB was defined as a biopsy for diagnosis with definitive treatment by radical hysterectomy and lymph node dissection, radiation followed by simple hysterectomy or primary

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ABBREVIATIONS USED IN TEXT

ACOS=American College of Surgeons
 CSS=Cancer Surveillance System

radiation.^{3,4} Women treated with primary radiation for stage IB cervical cancer were classified as receiving optimal care if treated with external or intracavitary or both forms of radiation. Information concerning the number of rads received or radiation fields was incomplete and was not taken into account in the classification of the quality of care. We were also unable to determine whether patients refused optimal care, for example, to avoid travel to an out-of-area hospital.

The patient characteristics of age, race and marital status were routinely coded by the CSS. The educational level (percentage of high school graduates among persons aged 25 or older in the patients' census tract) was used as the index of socioeconomic status. This variable was available only for the three urban counties (King, Pierce and Snohomish) in which 68 percent of the patients resided. Tumor histology (squamous or adenocarcinoma) was coded from the CSS abstract forms. Physician characteristics (age and specialty) were obtained through a Washington State physician survey completed in 1979; these characteristics were obtained for all physicians whose patients were designated as receiving suboptimal care and for physicians of a 50 percent random sample of patients who were designated as receiving optimal care, for a total of 184 patients. Hospital characteristics included (1) the number of new cancer patients per year (obtained from the CSS), (2) whether the hospital had an American College of Surgeons (ACOS) approved cancer program (ascertained from the Bulletin of the American College of Surgeons)⁵ and (3) the hospital's peer group (determined by the Washington State Hospital Commission, which uses a variety of criteria, such as the presence or absence of a house-staff training program and the types of services provided; 1=lowest, 5=highest).⁶ When multiple hospitals were listed, the hospital with the highest peer group was designated as the referral hospital. When only one hospital was given, it was considered both the initial and the referral hospital.

The data were cross-tabulated with quality of care as the dependent variable and other characteristics as independent variables. Patients with

stages IA and IB cervical cancer were tabulated separately and chi-square was used as a test of independence. Multiple regression was used to determine the relative importance of factors related to optimal care. Survival curves were computed for optimal and suboptimal groups in stages IA and IB. Survival times were censored depending on the date of last follow-up.

Results

Approximately 14 percent of women with stage IA disease (22/156) and 15 percent of women with stage IB disease (32/213) received suboptimal care. In the overwhelming majority of patients who received suboptimal care errors were made in diagnosis rather than in therapy—85 percent of suboptimal cases in stage IA and 72 percent of suboptimal cases in stage IB.

Patient Characteristics

Of the four demographic factors (age, race, marital status and educational level) examined in stages IA and IB cervical cancer, none were statistically significant (at $P=.05$) in relation to suboptimal care. But several factors showed interesting trends. A lower percentage of nonwhites with stage IA disease received optimal care than whites (nonwhites: 60 percent optimal out of 10 cases, compared with whites: 85 percent out of 142 cases, $P=.10$). Also, among women with stage IA disease, there was a trend toward more receiving optimal care as the percentage of high school graduates in the census tract increased (low education level tracts: 72 percent optimal care; medium education level: 81 percent; high education level: 96 percent; $P=.06$). Neither of these demographic relationships was seen in stage IB disease.

Tumor Characteristics

Patients with squamous cell carcinoma received a similar proportion of optimal care as patients with adenocarcinoma of the cervix.

County of Residence

A higher percentage of women who were residents of rural counties (90 percent) received optimal care than residents of urban counties (82 percent). Similarly, patients who resided in counties without radiation facilities were more likely to receive optimal care than patients in counties with radiation facilities (92 percent vs 81 percent). Although these relationships were

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not statistically significant, they were consistent in both stages IA and IB. Women with stage IB cervical cancer were more likely to receive optimal care if they did not have all their hospital care in their home county (home county only: 76 percent optimal vs some hospital care outside county: 94 percent, $P=.006$). This analysis excluded residents of King County, which is the major referral center, and virtually all residents of King County receive care in-county. Women with stage IB cervical cancer who received suboptimal care were more likely to have been admitted to only one institution (see Table 1).

Initial and Referral Hospital Characteristics

The quality of care received by women with stage IB disease was related to the number of new

cancer patients seen per year and the peer group of the initial and referral hospital (see Table 1). There was also a strong relationship between quality of care and ACOS approval for the referral hospital in the stage IB cases. Interestingly, no hospital characteristics of stage IA cases were related to the quality of care.

Physician Characteristics

Physicians specializing in obstetrics and gynecology provided a higher proportion of optimal care for women with stage IA disease than did those specializing in general surgery or family and general medicine. This relationship was even stronger in women with IB disease (see Table 2). There were no differences in age of physicians for those women who received optimal and suboptimal care.

Physicians doing radical surgical procedures were examined as a subgroup to document the number of such procedures each performed a year as an indicator of experience. Thirteen physicians had carried out at least one radical hysterectomy and lymph node dissection during the five-year study period. However, only five of the physicians had performed more than one radical procedure during the five-year period.

Survival

We found no significant difference in the three-year survival rate between optimal and suboptimal groups in stage IA (95 percent) or stage IB (89 percent) cervical cancer.

Multivariate Analysis

Because referral hospital characteristics and physician specialty were both strongly related to optimal care, we carried out a multiple regression analysis to determine which set of factors was more predictive of optimal care. Only the 184 patients for whom we coded physician specialty were included. Because optimal care was dichotomous and did not satisfy the assumption of a normally distributed dependent variable, we considered only the proportion of variance explained by each set of factors and did not consider statistical significance. For stages IA and IB cases the physician specialty explained more of the variation in optimal care than the hospital factors, regardless of the order of entry of each set of factors into the regression model. Both sets of factors combined explained 26 percent of the variation in optimal care among stage IB

TABLE 1.—Selected Hospital Characteristics in Relation to Optimal Care Received by Women With Stage IB Cervical Cancer (N=213)

Item/Categories	Number of Patients in Category	Percentage That Received Optimal Care	P(x ²)
Number of hospitals entered			
1	117	79	
2 or more	96	93	.02
Number of new cancer patients/year*			
Initial hospital:			
0-199	56	79	
200-499	60	82	
500+	97	91	.09
Referral hospital:			
0-199	19	47	
200-499	36	81	
500+	158	91	<.0001
Peer group†			
Initial hospital:			
1-3	113	81	
4-5	100	90	.08
Referral hospital:			
1-3	12	67	
4-5	201	87	.001

*Obtained from the Cancer Surveillance System.

†Determined by the Washington State Hospital Commission using a variety of criteria; 1=lowest, 5=highest number of criteria met.⁶

TABLE 2.—Optimal Care Received by Women With Cervical Cancer in Relation to Physician Specialty

Stage	Item/Categories	Number in Category	Optimal Care (percent)	P(x ²)
IA	Physician specialty			
	Obstetrics and gynecology	78	78	
	Family and general practice	16	63	
	General surgery	6	67	.44
IB	Obstetrics and gynecology	71	80	
	Family and general practice	21	67	
	General surgery	12	17	<.00005

cases but only 3 percent of the variation among stage IA cases.

Comment

Two factors could have potentially impaired our ability to determine the relationship between quality of care and other variables. First, there is a potential bias in a single reviewer determining the quality of care, even though the treatment of stage IA and IB cervical cancer is well established in the literature.¹⁻⁴ To assess this bias 41 case abstracts were randomly selected and independently reviewed by a second physician (H.K.T.), who agreed on the optimal-suboptimal assignment in 39 of the 41 cases. Kappa, a statistic that measures the agreement between two rates not due to chance,⁷ was 0.90 ($P < .0001$). Thus, the classification of cases as optimal or suboptimal appears to be highly reproducible.

A second potentially limiting factor is an error in the pathologic and treatment data collected on the abstract forms. We were not able to review the pathologic slides in this study. This slide review would be particularly important in establishing a diagnosis of microinvasive or stage IA cancer. In a few instances where the medical record abstract indicated the depth of penetration, the case was reclassified from invasive to microinvasive disease or vice versa (5 percent of cases). Otherwise, the pathologist's diagnosis was accepted. Errors in collecting treatment data are unlikely. A radical operation, simple hysterectomy or cone biopsy probably would not be overlooked because they would be recorded in several different places in a medical chart. It is also unlikely that radiation procedures would be missed because they would be indicated in the medical records if done in hospital or in radiologists' private offices, where the CSS sends abstractors to review records.

We had hypothesized that women with stage IB cervical cancer were more likely to receive optimal care if it was not all given in the home county (excluding King County, which is a referral center). This hypothesis was supported by the data. The reason is partially due to the surgical expertise in the larger hospitals of the referral counties. The relationship of suboptimal care and hospital care at a single institution is the result of less patient referral to larger centers. The expertise of the larger centers is shown by the positive relationships between optimal care and hospital characteristics (number of new cancer patients per

year, peer group and ACOS approval). These findings are consistent with those of Luft and associates,⁸ who found an inverse relationship between institutional surgical volume and mortality.

Physicians specializing in obstetrics and gynecology provided a higher frequency of optimal care than physicians in general practice or family practice and in general surgery, especially for stage IB patients. This finding is perhaps not surprising because those formally trained in obstetrics and gynecology should be most cognizant of the best methods of diagnosing and treating cervical cancer. Payne and Lyons,⁹ in a study of quality of care in Hawaii, also found that physicians trained in obstetrics and gynecology performed better than other physicians in the care of cervical cancer patients, as measured by a physician performance index.

The lack of difference in the three-year survival rates between the optimal and suboptimal care groups in stage IA cervical cancer is not surprising because most of the patients classified as suboptimal underwent simple hysterectomy for suspected carcinoma in situ and were diagnosed as having microinvasive cervical cancer from the pathologic specimen. So, even though patients did not have an optimal diagnosis, they did finally receive the standard definitive treatment. There was also no significant difference in survival rates between the optimal and suboptimal groups in stage IB. This lack of difference was probably due either to the short follow-up time or the possible efficacy of radiation immediately after simple hysterectomy, or both.^{10,11}

It should be noted that 22 women with stage IB cervical cancer in the suboptimal group received simple hysterectomy followed by radiation. Although we had no method of assessing morbidity for these cases, this dual type of therapy does increase the risk of complications and financial cost.

Summary

Evidently admission to hospitals with expertise in cancer care and diagnosis and treatment by an obstetrician-gynecologist promote optimal care. These findings suggest that (1) additional education on the diagnosis and treatment of cervical cancer should be offered to physicians who may encounter such cases in practice and (2) an approach to cervical cancer care organized by geographic region should be encouraged.

Due to the limitations of the medical records

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review approach used here, a study based on patient and physician interviews should be carried out to determine the decision-making process that led to both optimal and suboptimal care.

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